What is claimed is:

1. An optical communication system comprising:

a. a data source for generating electrical data;

b. a transmission filter having a transfer function that reduces adjacent symbol interference in a transmission spectrum, the transmission filter filtering the electrical data generated by the data source and passing the transmission spectrum;

c. a modulator for modulating the transmission spectrum on an optical signal;

d. a detector for detecting the modulated optical signal transmitted across an optical channel and converts the detected modulated optical signal to a received electrical data signal; and

e. a receiver filter having a transfer function that reduces adjacent symbol interference in the received electrical data signal, the receiver filter equalizing the phase and amplitude of the received electrical data signal in order to obey the Nyquist criterion.

2. The communication system of claim 1 wherein the optical channel is a dispersive optical channel.

3. The communication system of claim 2 wherein the transfer function of the receiver filter is dependent upon the dispersion across the optical channel.

4. The communication system of claim 3 wherein the transfer function of the receiver filter has a peak transmission and a phase equalization response that is a function of the dispersion across the optical channel.

5. The communication system of claim 1 wherein the transfer function of the transmitter filter has substantially optimized bandwidth.

6. The communication system of claim 1 wherein the transfer function of the transmitter

filter has substantially 100% excess bandwidth.

7. The communication system of claim 1 wherein the transfer function of the receiver filter reduces adjacent symbol interference in the received electrical data signal resulting from dispersion in the optical channel.

8. The communication system of claim 1 wherein the transfer function of the receiver filter reduces adjacent symbol interference in the received electrical data signal resulting from at least one of non-linear propagation and photodetection.

9. The communication system of claim 8 wherein an equalization of the transfer function of the receiver filter reduces adjacent symbol interference in the received electrical data signal resulting from at least one of non-linear propagation and photodetection.

10. The communication system of claim 1 wherein the transfer function of the receiver filter substantially maximizes the intersymbol interference limited Q.

11. The communication system of claim 1 wherein the modulator comprises a substantially chirp-free modulator.

12. The communication system of claim 1 wherein the receiver filter transforms the detected electrical data signal to a signal that has an autocorrelation function that is substantially equal to a portion of the electrical data generated by the data source.

13. The communication system of claim 11 wherein the autocorrelation function has an adjacent symbol interference that is less than 5%.

14. An optical communication system comprising:

a. a data source for generating electrical data;

b. a transmission filter having a transfer function that has substantially optimized bandwidth, the transmission filter filtering the electrical data generated by the data source and passing the transmission spectrum;

c. a modulator for modulating the transmission spectrum on an optical signal;

d. a detector for detecting the modulated optical signal transmitted across a dispersive optical channel and converts the detected modulated optical signal to a received electrical data signal; and

e. a receiver filter having a transfer function that reduces adjacent symbol interference in the received electrical data signal resulting from dispersion in the optical channel, the receiver filter filtering the received electrical data signal.

15. The communication system of claim 14 wherein the modulator comprises a substantially chirp-free modulator.

16. The communication system of claim 14 wherein the transfer function of the transmitter has substantially 100% excess bandwidth.

17. The communication system of claim 14 wherein the transfer function of the receiver filter substantially maximizes the intersymbol interference limited Q.

18. The communication system of claim 14 wherein the transfer function of the receiver filter has a peak transmission that is a function of the dispersion across the optical channel.

19. The communication system of claim 14 wherein the transfer function of the receiver filter reduces adjacent symbol interference in the received electrical data signal resulting from non-linear effects of propagation and photodetection.

20. The communication system of claim 14 wherein the receiver filter transforms the detected electrical data signal to a signal that has an autocorrelation function that is substantially equal to a portion of the electrical data generated by the data source.

21. The communication system of claim 20 wherein the autocorrelation function has an adjacent symbol interference that is less than 5%.

22. A method of reducing intersymbol interference in an optical channel, the method

comprising:

a. generating a transmission spectrum by filtering electrical data to reduce adjacent symbol interference caused by dispersion in the optical channel;

b. modulating the transmission spectrum on an optical signal;

c. transmitting the modulated optical signal across the optical channel;

d. detecting the modulated optical signal transmitted across the optical channel and converting the detected modulated optical signal into a received electrical data signal; and

e. filtering the received electrical data signal to reduce adjacent symbol interference.

23. The method of claim 22 further comprising filtering the received electrical data signal to reduce adjacent symbol interference in the optical channel caused by detecting the modulated optical signal.

24. The method of claim 22 further comprising optimizing the bandwidth of transmission spectrum.

25. The method of claim 21 wherein the peak transmission of the transmission spectra is a function of the dispersion in the optical channel.

26. The method of claim 22 further comprising filtering the received electrical data signal to substantially maximize the intersymbol interference limited Q.

27. The method of claim 22 further comprising filtering the received electrical data signal to transform the detected electrical data signal to a signal that has an autocorrelation function that is substantially equal to a portion of the electrical data generated by the data source.